**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in this application.

**Listing of Claims:**

1-165 (Canceled)

166. (currently amended) A system for obtaining a relatively high dynamic range image of a scene using a relatively low dynamic range image sensor adapted to be exposed to incident light from the scene for capturing an image thereof comprising:

a) an image sensor having a multiplicity of light-sensing elements in an array, each one of the light-sensing elements having a particular one of a plurality of sensitivity levels to incident light in accordance with a predetermined sensitivity pattern for the array of light-sensing elements and having a respective response function, each light-sensing element in response to incident light from the scene producing a captured image brightness value at a corresponding one of a multiplicity of pixel positions of a pixel position array, whereby each one of the multiplicity of pixel positions corresponds to a particular one of the plurality of sensitivity levels of the light-sensing elements;

b) a captured image memory for storing the captured image brightness values produced by the light-sensing elements at pixel positions of the pixel position array;

c) a first pixel position generator for providing the pixel positions of the pixel position array;

d) a sensitivity pattern memory for storing data indicative of the sensitivity level corresponding to each one of the first pixel positions of the pixel position array;

e) a response function compensator receiving pixel positions from the first pixel position generator, data indicative of the sensitivity levels corresponding to the received pixel positions from the sensitivity pattern memory and captured image brightness values at the received pixel positions from the captured image memory, and being responsive to a pixel position received from the first pixel position generator and data indicative of the sensitivity level corresponding to the received pixel position for retrieving from the captured image memory the captured image brightness value at the received pixel position and for compensating the retrieved captured image brightness value at the received pixel position by the inverse of the response function of a light-sensing element having the sensitivity level corresponding to the received pixel position to provide a respective compensated brightness value at the pixel position received from the first pixel position generator;

f) a compensated on-grid brightness value memory for storing respective compensated captured image values at the pixel positions received from the first pixel position generator;

g) a second pixel position generator for providing the pixel positions of the pixel position array;

h) an on-grid brightness value generator receiving pixel positions from the second pixel position generator and being responsive to each pixel position received from the second pixel position generator for deriving from the compensated captured image brightness values in the ~~captured image~~ compensated on-grid brightness value memory a respective output image brightness value at each received pixel position; and

i) an output image memory for storing the respective output image brightness value at each pixel position received from the second pixel position generator.

167. (original) The system of claim 166, wherein the response function compensator comprises a lookup table memory storing separate lookup table data representing the inverse of respective response functions of light-sensing elements having different ones of the plurality of sensitivity levels, and a mapper receiving captured image brightness values from the captured image memory and being responsive to a captured image brightness value at a pixel position received from the first pixel position generator for deriving a respective index for the lookup table memory, and retrieving therefrom a compensated on-grid brightness value corresponding to the respective index from lookup table data representing the inverse of the response function of a light-sensing element having the sensitivity level corresponding to the received pixel position, the retrieved compensated on-grid brightness value being provided to the compensated on-grid brightness value memory.

168. (original) The system of claim 166, wherein the array of light-sensing elements of the image sensor is a two-dimensional array, and the pixel position array is a two-dimensional array having pixel positions located at respective intersections of a plurality of regularly spaced pixel rows and a plurality of regularly spaced pixel columns, the pixel rows being orthogonal to the pixel columns.

169. (original) The system of claim 166, wherein the array of light-sensing elements of the image sensor is a linear array for capturing a line image and the pixel position array is a linear array having respective regularly spaced pixel positions of a linear pixel row, and wherein

the pixel positions provided by the pixel position generator have coordinates x, where x has values from 2.5 to xSize-2.5 and xSize is the dimension of the captured line image.

170. (currently amended) The system of claim 169, wherein the on-grid brightness value generator is responsive to a pixel position x received from the second pixel position generator for deriving from the compensated captured image brightness values in the ~~captured image~~ compensated on-grid brightness memory a respective output image brightness value at the received pixel position, the on-grid brightness value generator comprising:

i) a memory for storing a 5 × 1 Gaussian interpolation filter kernel G;

ii) a comparator for comparing each one of five compensated on-grid brightness values I(k) at pixel positions k having values from x-2 to x+2 with a predetermined low threshold value and a predetermined high threshold value;

iii) a multiplier for calculating a quantity I(k)G(k-x) for each value of k at which I(k) is greater than the predetermined low threshold value and less than the predetermined high threshold value, where G(k-x) is the value of the Gaussian interpolation kernel G at position (k-x);

iv) a first adder for adding the quantities I(k)G(k-x) calculated by the multiplier for each value of k where I(k) is greater than the predetermined low threshold value and less than the predetermined high threshold value to derive a first sum p;

v) a second adder for adding the values G(k-x) of the Gaussian interpolation kernel in the memory for each value of k where I(k) is greater than the predetermined low threshold value and less than the predetermined high threshold value to derive a second sum q; and

vi) a divider for deriving a respective output image brightness value $I_o(x)$ at the position x received from the second pixel position generator by dividing the sum p by the sum q.

171. (original) The system of claim 170, wherein the predetermined low threshold value is the noise level of a light-sensing element having the sensitivity level corresponding to the pixel position of the compensated on-grid brightness value being compared therewith compensated by the inverse of the response function of the light-sensing element, and the predetermined high threshold value is the saturation or near saturation brightness value of a light-sensing element having the sensitivity level corresponding to the pixel position of the compensated on-grid brightness value being compared therewith.

172. (original) The system of claim 170, wherein the 5 × 1 Gaussian interpolator filter kernel has the form:

| 0.1 | 3.6 | 10.0 | 3.6 | 0.1 |
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